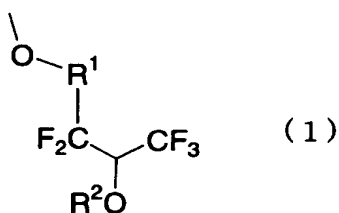


Amendments to the Specification

Please replace paragraphs [0008], [0021], [0032], [0033], [0037], [0043], and [0057] with the following amended paragraphs:

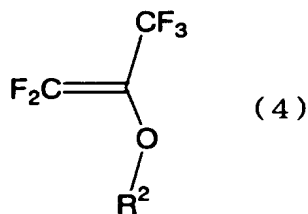
[0008] According to the present invention, there is provided a fluorine-containing compound or fluorine-containing polymerizable monomer, comprising a substituent represented by the formula 1:



where R¹ is (a) a straight-chain alkylene group, ~~or~~ (b) ~~a branched alkyl or~~ alkylene group, (c) a cyclic structure containing an aromatic ring group or aliphatic cyclic group, or (d) a substituent containing an aromatic ring group and an aliphatic cyclic group, and R¹ optionally contains fluorine, another halogen, CN, oxygen, nitrogen, silicon, or alcohol (which may be defined as a hydrocarbon group having at least one hydroxyl group), and

R² is a hydrogen atom, a straight-chain or branched alkyl group, an aromatic group, or a hydrocarbon group optionally containing an aliphatic cyclic group, and R² optionally contains fluorine, oxygen, nitrogen, carbonyl bond, or alcohol, and a plural number of R² having different structures are optionally contained in the molecule.

[0021] In the following, an exemplary process for synthesizing a compound having a structure (substituent) of the formula 1 is explained. In this process, a compound of the formula 4:



wherein R² is defined as in the formula 1, is reacted with R¹OH, R¹OR⁴ or R³ in the presence of peroxide. In the present invention, R¹OH is not particularly limited as long as it is an alcohol. Preferable examples of R¹OH are methanol, ethanol, isopropanol, butanol, ethylene glycol, propylene glycol, tetramethylene glycol, glycerol, ~~cyclohexanol~~ cyclohexanol, norbornene alcohol, adamantyl alcohol, monovalent and polyvalent alcohols having other cyclic structures. A part of R¹OH may contain ester bond and fluorine. Although R¹OH may apparently be a monovalent alcohol, it may also be a polyvalent alcohol in which R¹ contains another OH group. Another reactant R¹OR⁴ is a compound prepared by modifying R¹OH with R⁴ through an ether or ester bond, and it can be used in the above synthesis as a reactant analogous to R¹OH.

[0032] Exemplary (meth)acrylic esters (i.e., acrylic esters and methacrylic esters) for the above-mentioned comonomer are not particularly limited with respect to their ester side chains. They are (meth)acrylic alkyl esters such as methyl (meth)acrylate, ethyl (meth)acrylate, n-propyl (meth)acrylate, isopropyl (meth)acrylate, n-butyl (meth)acrylate, isobutyl (meth)acrylate, n-hexyl (meth)acrylate, n-octyl (meth)acrylate, 2-ethylhexyl (meth)acrylate, lauryl (meth)acrylate, 2-hydroxyethyl (meth)acrylate, and 2-hydroxypropyl (meth)acrylate; (meth)acrylates containing groups such as ethylene glycol, propylene glycol and tetramethylene glycol; unsaturated amides such as (meth)acrylic amide, N-methylol(meth)acrylic amide, and diacetoneacrylic amide; (meth)acrylonitrile, alkoxysilane-containing vinyl silanes and (meth)acrylic esters, tert-butyl (meth)acrylate, and cyclic (meth)acrylate such as 3-oxocyclohexyl (meth)acrylate, adamantyl (meth)acrylate, alkyladamantyl

(meth)acrylate, cyclohexyl (meth)acrylate, tricyclodecanyl (meth)acrylate and (meth)acrylate having cyclic structures such as lactone ring and norbornene ring; and (meth)acrylic acid. Further examples are (meth)acrylate containing a cyano group at ~~β-position~~ α-position and analogous compounds such as maleic acid, fumaric acid and maleic anhydride.

[0033] The fluorine-containing (meth)acrylic esters for the above-mentioned comonomer may have a fluorine atom or fluorine-containing group at their ~~β-position~~ α-position or may have a substituent having a fluorine atom at ester moiety. Such fluorine-containing groups at their ~~β-position~~ α-position may be trifluoromethyl group, trifluoroethyl group and nonafluoro-n-butyl group.

[0037] Further examples of the above-mentioned comonomer are styrene compounds and fluorine-containing styrene compounds, such as styrene, fluorinated styrene, hydroxystyrene, and a styrene compound in which a hexafluorocarbon group(s) is bonded to the benzene ring. In other words, the comonomer can preferably be selected from fluorine-containing styrene and hydroxystyrene, each containing fluorine atom or trifluoromethyl group substituted for hydrogen, and styrene compounds containing a halogen, an alkyl group or a fluorine-containing alkyl group at their ~~β-position~~ α-position.

[0043] The reaction vessel for conducting the polymerization (copolymerization) is not particularly limited. It is optional to use a solvent for conducting the polymerization. The polymerization solvent is preferably one that does not interfere with the radical polymerization. Its typical examples are esters such as ethyl acetate and n-butyl acetate; ketones such as acetone and methyl isobutyl ketone; hydrocarbons such as toluene and cyclohexane; and alcohols such as isopropyl alcohol and ethylene glycol monomethyl ether. Furthermore, it can be selected from various other solvents such as water, ethers, cyclic ethers, fluorohydrocarbons, and aromatic solvents. It is optional to use a single solvent

or a mixture of at least two solvents. Furthermore, it is possible to use a molecular weight adjusting agent, such as mercaptan, in the polymerization. The temperature for conducting the polymerization may be suitably adjusted depending on the type of radical polymerization initiator or radical polymerization initiating source. It is preferably 0-200°C, particularly preferably 30-140°C.

[0057] In a three-necked flask equipped with a reflux condenser and a stirrer, 99g of the first monomer, 79g of TFMA-B represented by the formula hereinbelow, and 82g of BTHB-NB represented by the formula hereinbelow were mixed together with 500g of n-butyl acetate, thereby preparing a solution. Then, 7g of azobisbutyronitrile (AIBN) were added as a polymerization initiator, followed by heating with an oil bath of 60°C. Under this condition, the reaction was conducted for 20hr. After the reaction, the obtained reaction solution was added to a large excess of n-hexane, followed by stirring. The resulting precipitate was separated by filtration and then dried under vacuum at 50°C for 18hr. The obtained polymer composition (the first polymer) was found by ¹H-NMR and ¹⁹F-NMR to be 38wt% of the first monomer, 32wt% of TFMA-B and 30wt% of BTHB-NB. Its weight average molecular weight (Mw) was determined by gel permeation chromatography (GPC) using polystyrene as a standard. The results of Examples 7-9 are shown in Table.